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VIDEO STUDY

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A. ACCIDENT

Location: Algiers Lock, New Orleans, Louisiana
Date: July 4, 2023
Time: 1808 Central Daylight Time
Vessel: Barge EMS 317 pushed by towing vessel Kitty

B. SUMMARY

B.1. The accident

On July 4, 2023, about 1808 central daylight time, barge EMS 317, while being pushed by the towing vessel Kitty, made contact with the southwestern lock gate of the Algiers Lock in New Orleans, Louisiana. While the barge only sustained minor damage (2-foot by 2-foot inset, approximately 5 inches deep), the lock sustained significant damage to the port gate (approximately 16-20-foot-long crack). No injuries or pollution reported.

B.2. Objective and scope of the Video Study

The objective of this video study was to estimate the water level fluctuations in the lock chamber while the vessel was there. Estimation was based on videos recorded with cameras installed on the towing vessel.

C. DETAILS OF THE INVESTIGATION

Four videos recorded with cameras installed on the towing vessel Kitty were available. The recordings started before the towing vessel entered the lock and they covered the time when the barge contacted the southwest gate of the lock and continued past the time when the towing vessel exited the lock chamber. The barges and the towing vessel entered the lock from the Mississippi river side, through the eastern gates. Because of the accident and the damage to the southwest gate, they exited the lock through the eastern gates, moving astern.

Figure 1 shows an aerial view of the Algiers Lock. The figure shows two tank barges and a towing vessel inside the lock chamber along the south wall. Although similar in the size of tow, the barges and the towing vessel in the figure are unrelated to the accident analyzed in this report.

One of the four videos, labeled CH02, recorded the best images for water level estimation. The video had 1920x1088 resolution and frame rate of 30 fps (frames per second). The video lasted about one hour. The bow of the towing vessel Kitty entered

the lock chamber at about CH02 video time 7 minutes. The bow of the towing vessel Kitty exited the lock at about video time 35 minutes.

Figure 2 shows a segment of a frame from the CH02 video recorded at video time 13:26.359. The gray rectangle covers the image of a barge worker. Several ladders, such as the one seen in the figure, are installed on the lock walls. The spacing of the rungs of the ladders was used as a gauge for measuring the water level. The spacing of the rungs of the ladders was measured to be 12.0 inches, meaning that one rung spacing equals one foot. The distance W1, marked in Figure 2, from water level to a reference level, is estimated to be 0.9 rung spacings or 0.9 feet. The bent rung seen in the figure was used as the reference level.

The CH02 video recorded three ladders on the south side lock wall as the towing vessel on which the camera was installed was moving through the lock. Ladder no. 3, the third one from the eastern lock gates, was the main one used for water level estimation. This ladder allowed the estimation of the water level at four times, including once shortly before the southwestern lock gate contact and once shortly after the contact. Ladder no. 1 and ladder no. 2 were seen in the video only longer in time before the lock gate contact and longer in time after the lock gate contact. Water level fluctuations measured based on these ladders were lower than those measured based on ladder no. 3.

Figures 2, 3, 4 and 5 show segments of CH02 video frames recorded at video times 13:26.359, 15:00.024, 15:19.857 and 16:33.557 respectively. The water levels at these times were estimated to be 0.9, 3.25, 1.75 and -0.1 feet. It was estimated based on the CH02 video that barge EMS 317 contacted the lock gate at video time 15:52.190, the time when the forward motion of the towing vessel stopped. This video time was used as a reference time, time zero seconds, for displaying the estimated water levels.

Figure 6 is a plot of the estimated water levels. The lowest measured water level was set to zero in the figure. The highest measured water level was 3.35 feet, measured about 41 seconds after the lock gate contact. The barge was moving sternway at that time, away from the lock gate. Between times -52 seconds and time -32 seconds, the water level was increasing at the highest observed rate. During this time period, the speed of the towing vessel seen in the video was the highest as it was approaching the lock gate.

Only four water level measurements were possible during the analyzed 187.2 seconds. They are marked by the four blue circular markers in Figure 6. The straight blue broken lines interconnect the circular markers. These lines should not be viewed

as accurately interpolated water levels. At any time, the actual water levels could be above or below these lines. Furthermore, the actual water levels at times other than the four times when water level measurements were possible and at locations other than ladder no. 3 could be above or below the blue markers. Therefore, the difference between the highest measured level and the lowest measured level could be higher than 3.35 feet. Consequently, the estimated highest water level variation in the lock, the 3.35 feet seen in Figure 6, should be viewed as a lower limit on the highest water level variation.

Figure 3 shows a wet lock wall area that is above the water level at the time when that video frame was recorded. It means that the water level at that location was higher at an unknown earlier time. Such wet wall areas at the ladder no. 3 location are seen in the video frames recorded at video times 13:26.359, 15:00.024 and 15:19.857. The corresponding water level was 2.75 feet above the lowest measured water level in the video. The red square markers in Figure 6 are at this water level. The water reached this level at some unknown time before time -150 seconds, the earliest time shown in Figure 6.

D. CONCLUSIONS

A video recorded with a camera installed on the towing vessel Kitty was used to estimate the water level variations in the Algiers Lock. The highest estimated water level was 3.35 feet above the lowest estimated water level. Since only four water level estimates were possible during the analyzed 187.2 seconds, the estimated 3.35 feet water level variation should be viewed as a lower limit on the actual water level variations.

FIGURES

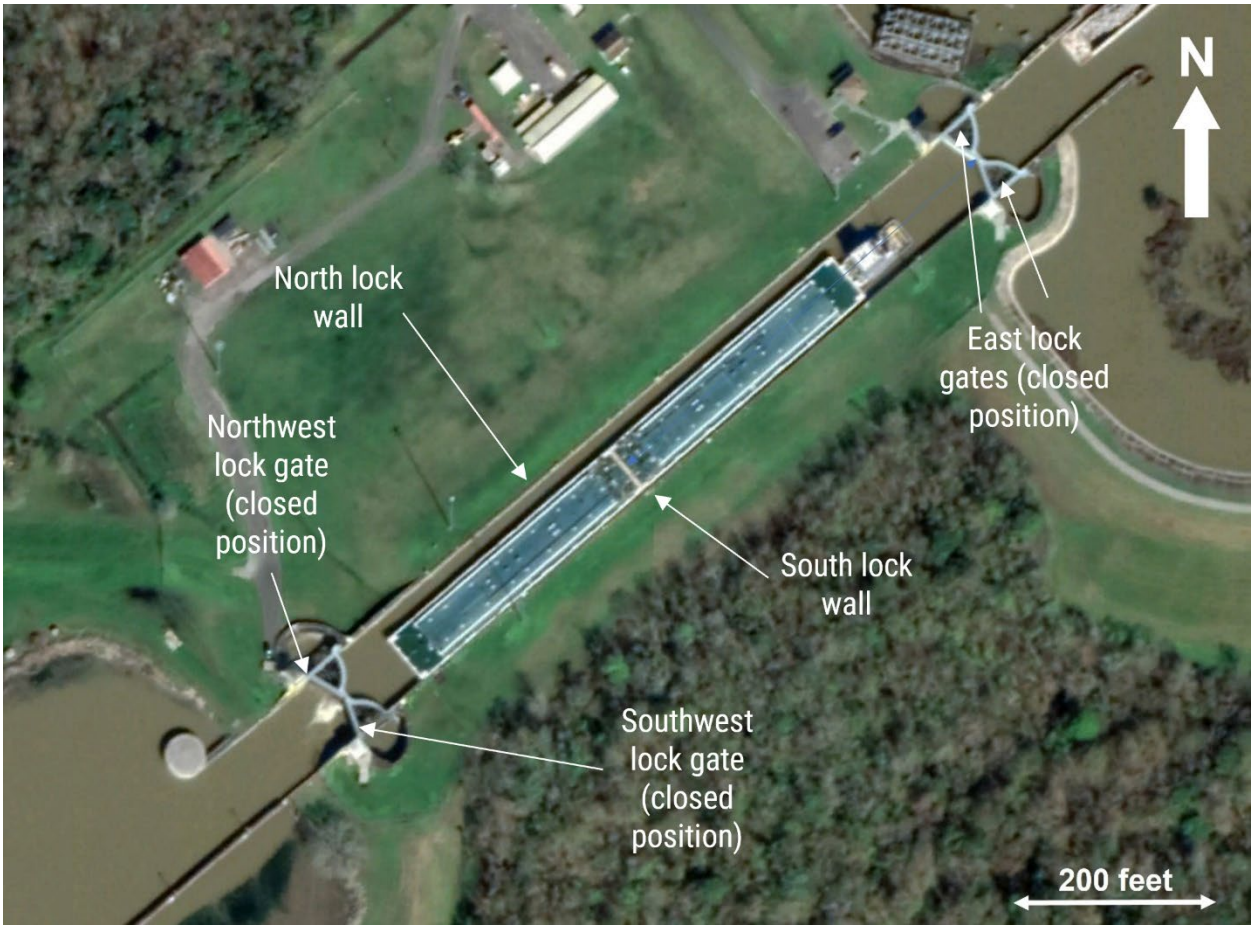

Figure 1. Aerial view of the Algiers Lock

Figure 2. Segment of CH02 video frame recorded at video time 13:26.359

Figure 3. Segment of CH02 video frame recorded at video time 15:00.024

Figure 4. Segment of video CH02 frame recorded at video time 15:19.857

Figure 5. Segment of video CH02 frame recorded at video time 16:33.557

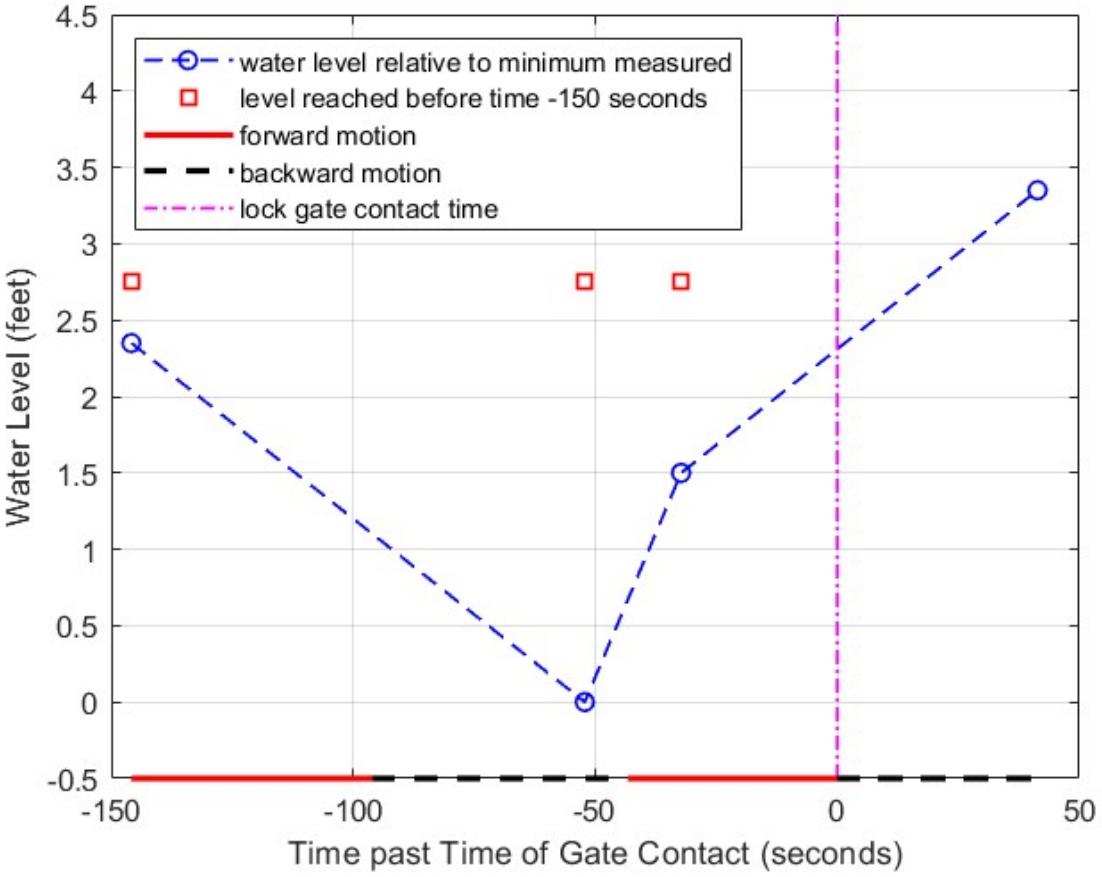

Figure 6. Estimated water level over time